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1. INTRODUCTION

Welcome to the world of JVA monitored electric security fences. The proliferation of non-lethal, monitored, electric security fences in our towns and cities is indicative of the confidence the public has in this form of perimeter security. The reason for this popularity is simple – monitored electric security fences are effective, economical, simple to install, and they offer more D's of security than any other perimeter system:

DEMARCATION – The JVA fence around your property shows you mean business.
DEFLECTION – Would-be intruders will be deflected to softer targets.
DETERRENCE – The safe, powerful JVA shock is a strong deterrent to intruders.
DELAY – The physical barrier will delay an intruder, something they do not like.
DETECTION – The JVA's voltage monitor warns you of any tampering with the fence.
DENY – A well-erected electric security fence will deny entry.
DEPENDABLE – 60 seconds a minute, 60 minutes an hour, 24 hours a day, 365 days a year, your JVA electric security fence is monitored by an alert, sober, electronic watchman.

Every second, the JVA Z energiser discharges a very short-duration, safe, high-voltage pulse down the fence live wire. The JVA Z energiser then monitors the voltage at the end of this live wire, thereby checking that the voltage is being maintained along the entire fence line. In the event of a voltage drop caused by either shorting, cutting or poor maintenance, the monitor will trigger an alarm, thus alerting you.

Manufactured to meet the most stringent international safety standards, the JVA Z energiser is in a class of its own when it comes to features and benefits at an affordable price.

An electric fence system which meets current safety regulations

2. FEATURES

2.1 Power

- 8 joules peak output energy (4 Joules per zone)
- Mains powered via external transformer (16–18Vac)
- Battery charger with space for internal 7A/H 12V rechargeable back up battery

2.2 Control / Monitoring:

- 3 Control inputs which can be configured to take N.O. or N.C. control contacts.
- 3 12V driven outputs (also referred to as relays), high side switched (common negative)
- All relays may be assigned to any alarm function
- LCD voltage display
- LED status lights
- Internal beeper
- AC fail, Low Battery and Bad Battery detection
- Keypad programmable options
- Low power mode – ensures detection together with public safety during the day
- Adjustable energiser power output level

2.3 Safety

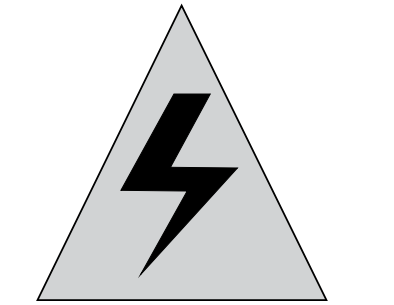
- Designed to pass IEC60335.2.76 and EMC standards (reports available on request)
- Enclosed fence terminals
- Wall mountable, robust enclosure with detachable PCB chassis for ease of installation and repair

2.4 Reliability

- Microprocessor controlled.
- Pluggable screw terminals
- State of the art, robust, case design IP4x ABS
- Inbuilt lightning protection from both mains and fence sides, external fence lightning protection is still advised in high lightning prone areas
- All inputs and outputs protected against stray fence voltage

3. SPECIFICATIONS

Specification Name	Specification
Energiser Output Voltage	8.5kV peak no load
Peak Output Energy	8 Joules at 500 Ohms
Pulse Rate	Crystal locked at 0.8 Hz
12v DC Power Consumption	Energiser On – 550mA Average, 700mA peak Energiser Off – 28mA 40mA Not including keypad or auxiliary power
AC Power Input	16Vac 2A
Battery Charger Output	Float voltage 13.8V, 350mA, short circuit protection
Outputs	12V 2.5A maximum combined load
Enclosure	IP4x ABS plastic
Size	300mm high, 190mm wide, 115mm deep
Weight – packed, no battery	2.5kg



WARNING

- There are no user-serviceable parts in this unit.
- The installer is reminded that high voltages are retained for a while after switching off, and to wait for at least 10 minutes before opening the case.
- Before working on the high voltage wiring of an electric fence, it is recommended that the energiser be disarmed and an intentional short circuit is placed from the fence live wires to earth. This is a sensible precaution against the energiser being turned on by others or malfunctioning while working on the fence.

4. DESCRIPTION

The Z18 is a single channel, standard (non Bi-Polar) 8 Joule (Output) security energiser. The Z28 is a dual channel standard (non Bi-Polar) 8 Joule (4 per channel) security energiser. Both the Z18 and Z28 are made on the same PCB, for the Z18, single channel version the 2 outputs are bridged.

This manual relates to:

- PCB versions: 7.51 and higher
- Firmware versions: 7.50 or higher (the firmware version is shown on the LCD on reset)

4.1 JVA Z18 Exterior

Figure 1: Z18

4.2 JVA Z18 – High Voltage Terminals

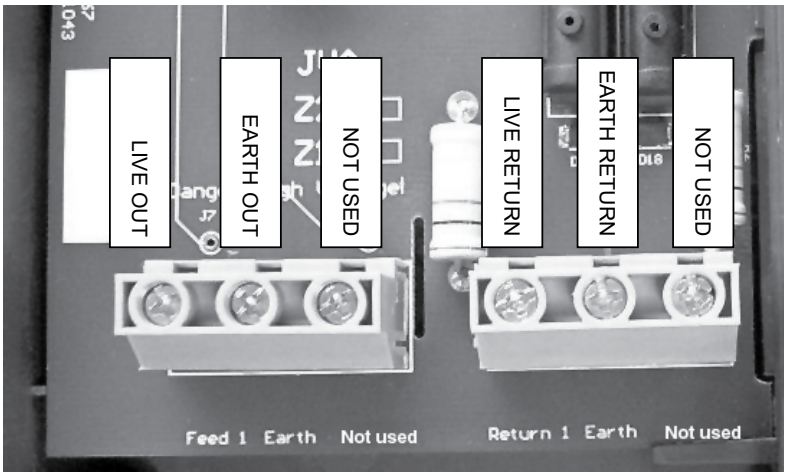


Figure 2: Output Terminals in Conventional Mode

4.3 LCD Voltage Display

The display on the JVA Z18 shows the voltage at the fence and return terminals.

Z18: Left side = Return, Right side = Feed.

The LCD also shows the programming option and current setting when in programming mode. This allows the programming options settings to be checked easily.

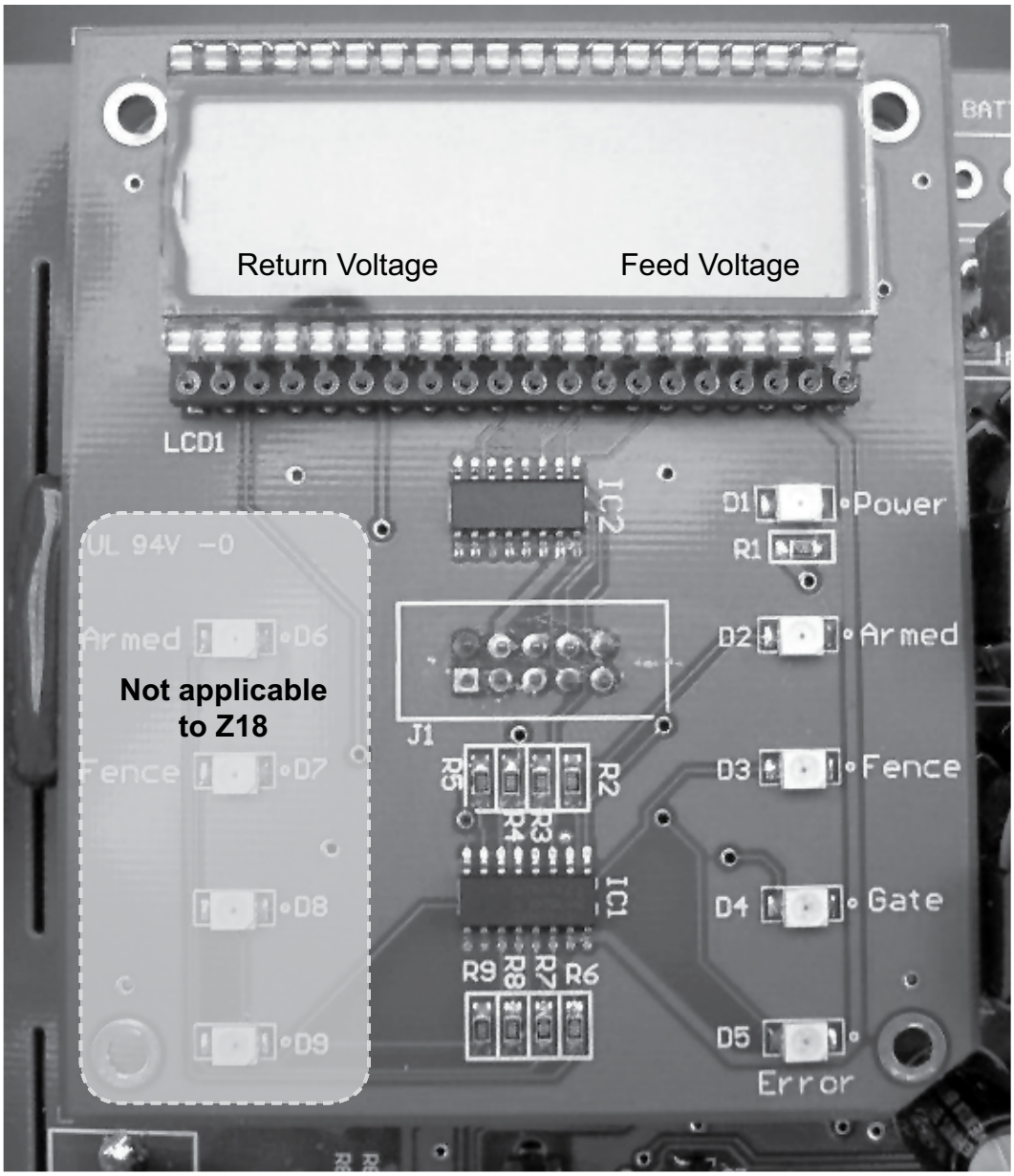


Figure 3: LCD Display and Status LEDs

4.4 Status Lights

(See Figure 3.)

Left side *(Not applicable to Z18)*

Right side

Power	*On* whenever the unit has power.
Armed	*On* when the unit is armed (pulsing), will flash when in low voltage mode.
Fence	*On* when there is a fence alarm.
Gate	*On* when there is a gate alarm.
Status	Flashes a code for energiser conditions. See the table in section 7.2 – Status Codes.

4.5 Inputs and Outputs

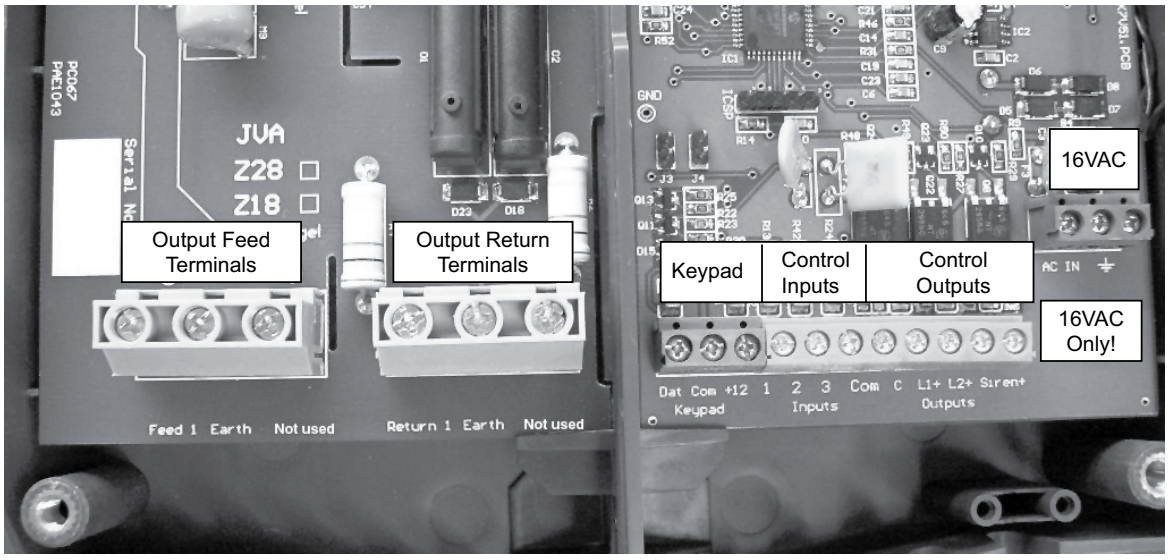


Figure 4: Connection Terminals

4.6 Keypad (0ptional)

A keypad can be used to remotely monitor and control the Z18. It is also used to set the programmable options. See section 8.5.

Figure 5: LCD Keypad

4.7 Keypad Lights

Power	*On* with AC power, flashes on low battery.
Service	*On* with any Energiser fault (like low battery).
Arm	*On* when the Energiser is armed (pulsing), flashes when in low power mode.
1	*On* when there is a fence fault.
2	*On* when there is a fence fault negative wires.
3	*On* when the gate input is open.
4, 5, 6	Not used

NOTE: There is no panic function.

For information on how to control the Z18 via the keypad see section 6.

4.8 Internal Beeper/Keypad Beeper

Depending on the *chime* setting, the internal beeper and keypad beeper will sound when there is a fence alarm, a gate alarm or a general alarm or a door chime. On flat battery the keypad will always beep 4 times before the energiser automatically enters low voltage mode to preserve the battery. On AC Fail it will not beep.

4.9 Cabling

High voltage cabling (fence lead out and returns) should be run using suitably rated cable. Double insulated electric fence “underground” cable is suitable. High Voltage Cables must **never** be run within the same conduit as Low Voltage Cables. A minimum distance of 30mm should be kept between High Voltage and Low Voltage cables.

4.10 Lightning Protection

Although the Z18 contains internal lightning protection elements, external lightning protection elements such as additional external lightning kits available from your local dealer, are recommended as they would help to reduce lightning damage even further.

4.11 Earth Loop Monitoring

The Z18 has two fence earth terminals which when wired into an insulated series looped fence system enable the energiser to monitor the earth circuit. If this is not required the installer can loop the two earth terminals at the energiser and then connect the earth spikes to one of the parallel earth terminals.

4.12 Noise and Interference

The Z18 contains a microprocessor. Extreme electrical noise can upset microprocessors. The most likely cause of such noise is the high voltage output from the unit itself. In the event of erratic behaviour, check that the high voltage wiring is firmly connected to the terminals and that no sparking is seen. The Z18 is designed to self-recover from interference, powering off (both AC and battery) should not be necessary.

4.13 Programmable Options

The Z18 has many programmable options. These are also known as *setup parameters*. To alter these options a keypad must be used. The options are explained in *Programming Options in Brief on* page 20. Each parameter has a factory set default.

4.14 Low Power Mode

Z18 energisers can be switched into low power mode. Low Power mode may be used in situations where the fence is not required to be a deterrent but is still required to actively detect intrusion. In Low Power mode the fence live wires operate at a much lower voltage, typically 500V peak. See *Programming Options in Brief on* page 20 for details on using the keypad to set low voltage mode.

4.15 Control Inputs

The Z18 has 3 control inputs. These default to:

Input 1 – Arm/Disarm
Input 2 – Gate 1
Input 3 – High/Low power

The gate inputs may be wired to a gate switch to trigger an alarm when a gate is opened.

NOTE: If not used, the Gate 1 and Gate 2 inputs must be bridged to the *Com* terminal.

If the unit is disarmed, the gate input may be set to chime mode. See *Programming Options in Brief* on page 20.

4.16 Groups

The Z18 may be linked to form a “group” to power multiple zones. See pages 26 and 27.

5. INSTALLATION

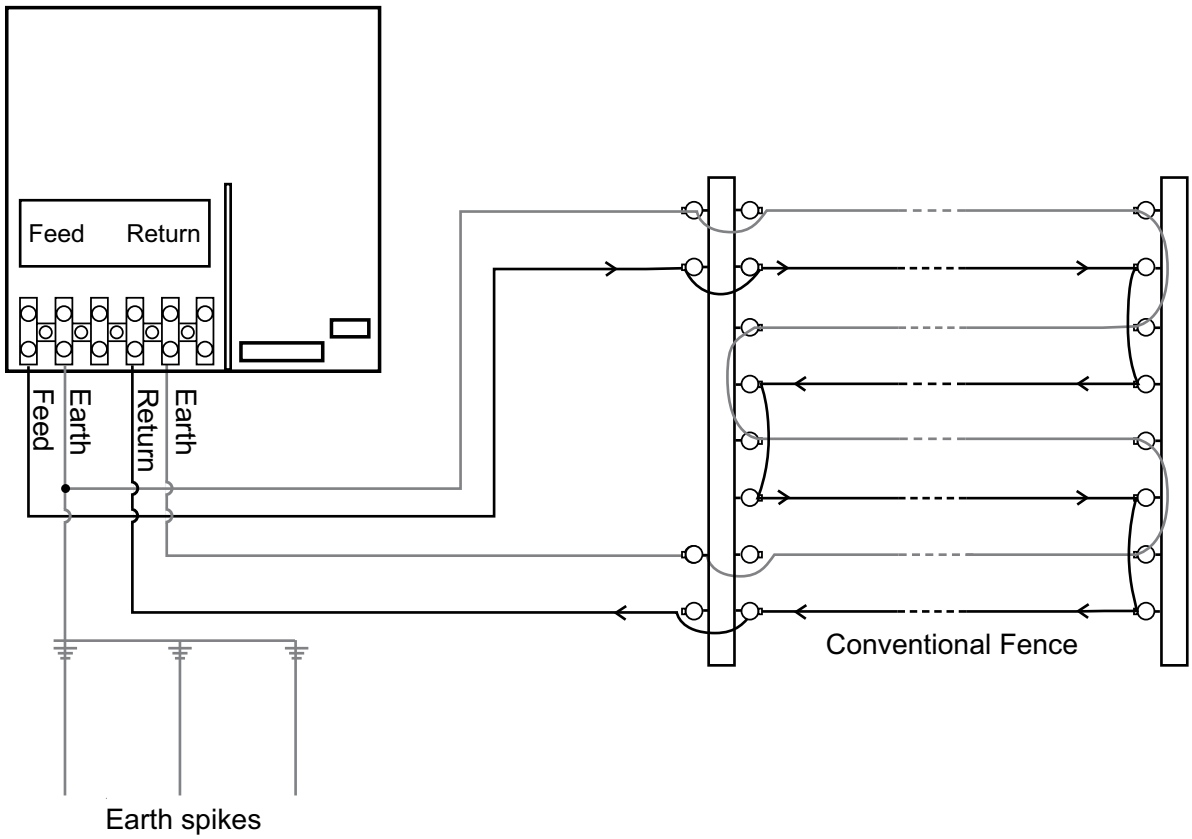
JVA recommends installation by qualified technicians.

5.1 Installation Steps

1.	Read the entire manual first!
2.	Design and build the fence. (Beyond the scope of this manual.)
3.	Decide where the JVA Z18 is to be mounted. If on an external wall it should be housed within an equipment box and definitely not in direct sunlight or where it could get wet.
4.	Mount the unit by hanging the housing on the two nail-in anchors provided. If necessary, two extra mounting holes can be used at the bottom of the housing.
5.	If using a keypad, remove the rear housing of the keypad and fix it to the wall.
6.	Wire the low voltage cables to the PCB terminals (right side)*. (See page 8)
7.	Wire the high voltage cable to the PCB terminals*. (See page 8)
8.	Fit the battery leads to the battery. The *Status* LED should blink twice to show mains fail.
9.	The unit is designed not to start when first powered up irrespective of the state of the inputs.
10.	Replace the front cover.
11.	Turn AC power on.
12.	Arm and disarm the energiser via the keyswitch or keypad, if fitted. The *Status* LED should stop blinking.
13.	Arm the unit. The LCD display will now show the fence voltage.
14.	Check to ensure that a short anywhere on the fence triggers the alarm.
15.	On handing the system over to the owner/user, explain how to change the user PIN. Leave a User Manual with the user.

NB** ***Keep high voltage and low voltage cables at least 100mm apart. Do not run high and low voltage cables in the same conduit.

5.2 Example Fence Wiring Diagram



JVA Z18 Energiser Fence Wiring, Including Earth Monitoring

6. OPERATION

6.1 Arm/Disarm Control

The unit can be controlled by the control input 1 or via a keypad. The keypad also allows instant audiovisual indication of the state of the energiser and therefore the fence it is powering.

If there are two ways to control the energiser both connected at once, i.e. keypad and control inputs, then the last change will determine the result. So if the unit is armed via the keypad and then disarmed at the control input it will disarm.

6.2 Arming the Fence Using the Keypad

- Enter your **PIN** number (four digits long) and push the **#** key.
- Make sure the red ARM light comes on.
- The keypad will beep twice to confirm that the system is armed.
- The fence will power up and if all is well (no faults) the system will be ready to deter and detect.
- If there is a fault on the fence and it cannot achieve full voltage, LCDs will flash.
- To disarm the system, enter your **PIN** and press **#**. This will also clear any fault lights and zone lights which may have been on.

6.3 Turning to Low Power mode

To switch to Low Power mode, enter your **PIN** and press ***41#**. In Low Power mode the fence will still be powered and any breach will be detected, but the voltage will be much lower than normal operation. The ARM light will flash in Low Power mode.

Enter your **PIN** and press ***42#** to switch back to Full Power mode.

Alternatively, the unit can be switched to Low Power mode using the gate switch input, if it has been programmed accordingly.

6.4 When an Alarm Occurs

If the system is armed and the fence is tampered with, the corresponding *Zone Light* will flash on the energiser and then remain on. Relays assigned to alarms will turn on. If the energiser is connected to a building alarm system for monitoring, an alarm signal may be sent to the alarm company monitoring the alarm system.

If a keypad is connected to the system, pressing the # key will identify the zone condition.

An alarm will also sound if input 2 is assigned to the “gate input” function and the gate input is opened and the entry/exit delay time has elapsed.

6.5 To Silence the Alarm

- Enter your **PIN** and press **#**. This will silence the alarm but not disarm the system; the *Armed Light* will still be on. The system will be ready for the next alarm.
- The zone lights on the keypad will flash to show where the breach occurred.
- The siren and strobe are ready to respond again if triggered.
- To disarm the system, enter your **PIN** and press **#** again. This will also clear the zone light.
- Alternatively, disarming using the key switch will reset the alarm.

6.6 Changing the PIN Number

- Enter the old 4-digit PIN and press ***0#**. This enters User Programming mode.
- Enter your new PIN (must be 4 digits) and then **#**.
- Press ***#** to exit User Programming mode.
- Make sure your new PIN works by using it to arm the energiser.
- The default PIN is 1 2 3 4.

6.7 Standby Battery

Should there be a loss of mains power, the *Power Light* on the keypad will go off. Output power will be reduced to conserve battery power. If the loss of power is prolonged, the battery may discharge power and become ineffective. The *Power Light* will start to flash indicating a battery low power problem. If the standby battery requires replacement, the *Power Light* will flash and the *Status Light* will be on.

6.8 Status Light

If the energiser develops an internal fault, the *Status Light* will flash a code. See section 7.2 (page 18).

6.9 Keypad Control in Brief

In the following table, XXXX is the 4-digit PIN. The default PIN is 1 2 3 4.

ACTION	PRESS KEYS
Turn on / ARM	XXXX#
Turn off / DISARM	XXXX#
Silence an alarm	XXXX#
Switch to Low Power mode	XXXX*41#
Switch to High Power mode	XXXX*42#

7. TECHNICAL INFORMATION

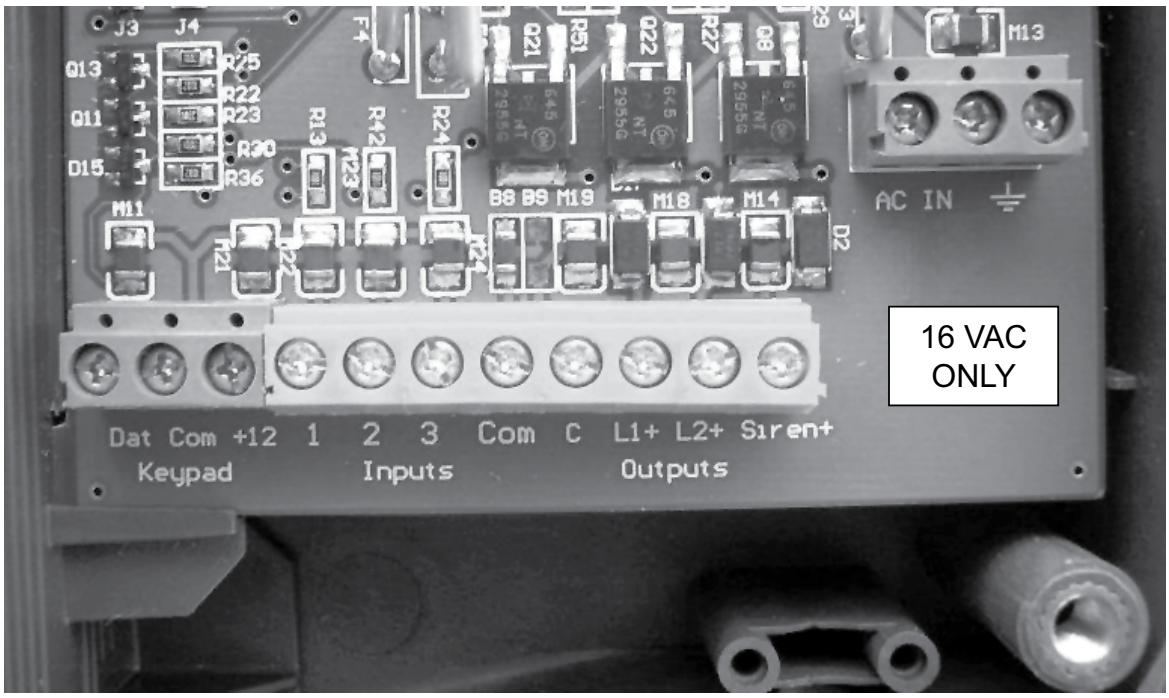


Figure 6: Low Voltage Terminals

Label	Type	Description
Keypad	3 Way	Supplies power and data line for an external keypad. The +12 source on these terminals is protected with a 1A self-resetting fuse.
Inputs	4 Way	Energiser control inputs (dry contact). Defaults to normally open. Can be used for a remote switch or a radio receiver. The receiver may be powered from the keypad +12V terminal. See section 4.
Outputs	4 Way	Siren and Strobe or other outputs. See section 4 and 8 (Programming Options).
AC IN	3 Way	16Vac power input. Fused via F3 1A self-resetting fuse.
Batt	Leads	12V dc or battery connection via F1 (3 Amp self-resetting fuse.

Low Voltage Terminals

NOTE: To reset the fuse, remove power for a few seconds and then reapply power.

7.1 Power Options

The unit has 2 sources of power, 16VAC and 12VDC (Battery).
NOTE: Use only rechargeable batteries. Always ensure adequate ventilation is available for the housing if it contains a battery. Lead acid batteries may emit explosive gases while charging! Always make sure that a battery is connected to the energiser before applying AC.

7.2 Status Codes

Status LED Number of Flashes	Interpretation	Corrective Action
1	Not used	
2	16 VAC Mains fail	Restore mains power. Can be bypassed by fitting J3
3	Low battery, bad battery	Charge or replace battery
4	PCB service fault	Return to repair/service centre

Status Codes

If an error occurs, the relay assigned to general alarm will go into alarm state. Minor errors will self clear if the error condition is removed. If the mains power fails, it will not disarm the energiser, nor will low battery. However, without mains power, the battery will eventually be depleted and the energiser will attempt to maintain operation by entering low power mode after 4 warning beeps. If the battery charge continues to fall, the energiser will eventually stop. Once mains power has been restored and the battery has recovered, the energiser will re-arm itself automatically after 4 warning beeps. A PCB fault will disarm the energiser. If an error disarms the energiser, the general and fence alarms will activate.

If an error has momentarily caused the energiser to stop pulsing, this can be corrected by disarming and rearming the unit. Should the error recur, return the unit for service.

7.3 Jumpers

The unit has two special purpose jumpers (links). These are listed in the table below.

Jumper	Function	Purpose
J3	DC only jumper	Fit J3 to inhibit mains fail errors, if the intention is to operate the Z18 on DC only (as in Solar Power systems)
J4	Factory default jumper Off to return programmable options to factory defaults upon power up	If the energiser needs to be defaulted to factory settings, remove all power – AC and battery and remove the J4 jumper. Reapply the battery power first, then 16 VAC power. Reapply the J4 jumper and the unit will be reset to default settings.

Jumpers

8. INSTALLATION PROGRAMMING OPTIONS

The unit has a non-volatile memory in which programming options (setup parameters) are held. These are factory pre-set but can be field programmed using a keypad.

8.1 Programming Mode

To enter Programming mode, enter the 6-digit installer **PIN** followed by ***0#** keys. The keypad will beep twice to indicate that the command was accepted. If the PIN was incorrect, the keypad will beep 3 times. The LCD will now show the first programming option and its current setting.

Pressing the # key will cycle through all the options on the LCD.

NOTE: Not all numbers are used. The default installer PIN is 0 1 2 3 4 5.

8.2 To Exit Programming Mode

After programming, press ***#** to exit. If left unattended, the unit will *time out* and *auto exit* Programming mode after approximately 5 minutes.

8.3 Changing the Installer PIN

The installer PIN may only be changed while in Programming mode.

To enter a new installer pin, press **00** followed by the new 6-digit **PIN**, then the **#** key.

If you cannot remember your installer or user PIN, return the unit's memory to default. To do this, remove power (AC off and disconnect the battery), open the energiser, remove jumper J4 and reconnect the battery for about 10 seconds. Do not forget to re-fit J4.

This will return all options to the factory set defaults.

8.4 Changing an Option

Most of the options have possible values in the range of 0 to 9.

To change any options, the unit must be in Programming mode. Check the option number (see table below) and then the table of values for that option. Then press the option number followed by the required value. When the programming is completed, exit from Programming mode. (See 8.2 above.)

For example, to change the power level to maximum press **019#**, the keypad will beep twice to indicate that the command was successful. The LCD will immediately show the updated value.

8.5 Programming Options in Brief

See page 21 for more detail.

Option	Function	Description
01	Power Level	Sets the output power levels
02	Low Power level	Sets the output power levels used in Low Power mode
03	Fence Alarm Voltage	Sets the voltage threshold below which the fence alarm will occur
04	Fence Alarm Voltage Zone 2	Reserved for 2-channel unit
05	Low Power Alarm Level	Sets the voltage threshold below which the fence alarm will occur in Low Power mode
06	Missed Pulse Count	Sets the number of pulses which may be missed before the alarm is activated
07	Battery Alarm Voltage	Sets the battery voltage threshold below which the general alarm will activate
08	Siren *On* Time	Sets the time that the siren (and keypad beeper) will stay on after an alarm
09	Siren *Off* Time	The amount of time the siren will be off for after the *On* time has expired
10	Siren Cycles	The number of times the siren will sound for the *On* time function above. After this many cycles the siren will automatically mute
11	Input Inversion	*Closed to arm* or *Open to arm*
12	Gate Input Function	Gate Switch mode or Low Power Switch mode
13	Gate Exit Delay	Time from gate switch opening to alarm
14	Chime Mode	Allows the keypad and internal beeper function to be altered
15 – 20	Not used	
21	Relay 1	Used to assign an alarm function to output L1
22	Relay 2	Used to assign an alarm function to output L2
23	Relay 3	Used to assign an alarm function to Siren or output 3
24	Relay 4	Used to assign an alarm function to output 4, on the optional daughterboard
25	Relay 5	Used to assign an alarm function to output 5, on the optional daughterboard.
26	Group ID	Allows the energiser to be set as a Master or slave in a synchronised group. Not available in all markets.

Programming Options

8.6 Programming Options in Detail

8.6.1 Power Level (01x#)

The power level option allows the shocking power of the fence to be adjusted. For example: To change the power level to *maximum*, enter the following:

0 1 9 # or **0 1 0 9 #**.

The keypad will beep twice to indicate that the new setting has been accepted.

The normal fence voltage depends on the amount of fence wire, the losses and the power level.

This setting affects the average power drain and therefore backup battery time.

Kilovolt settings refer to a 1000 Ohm load, actual fence voltages will depend on the type and length of fence.

Note: The bold panel in each table indicates the default value.

Value (x)	Voltage
0	2.0kV
1	2.6kV
2	3.3kV
3	3.9kV
4	4.5kV
5	5.1kV
6	5.8kV
7	6.4kV
8	7.0kV
9	**7.7kV**

Power Level (01x#)

Value (x)	% of High Power
0	0.5%
1	1.0%
2	1.5%
3	2.0%
4	2.5%
5	3.0%
6	**3.5%**
7	4.0%
8	4.5%
9	5.0%

Low Power Level (02x#)

8.6.2 Low Power Level (02x#)

Same as above, but for Low Power mode.

8.6.3 Fence Alarm Voltage (03x#)

This option sets the voltage threshold below which the fence alarm will occur. The default Fence Alarm Voltage is 4 kV.

Value (x)	Voltage Conventional Mode	Voltage Bi-Polar Mode
0	1.5kV	1.5kV
1	2.0kV	1.8kV
2	2.5kV	2.1kV
3	3.0kV	2.4kV
4	3.5kV	2.7kV
5	**4.0kV**	**3.0kV**
6	4.5kV	3.3kV
7	5.0kV	3.6kV
8	5.5kV	3.9kV
9	6.0kV	4.2kV

Fence Alarm Voltage (03x#)

8.6.4 Fence Alarm Voltage Zone (04x#)

Reserved for two-zone unit.

8.6.5 Low Power Alarm Level (05x#)

This option sets the voltage threshold below which the fence alarm will occur. The default Fence Alarm Voltage is 500 Volts.

Value (x)	Voltage
0	300 Volts
1	**500 Volts**
2	700 Volts
3	900 Volts
4	1100 Volts

Low Power Alarm Level (05x#)

Value (x)	Missed Pulses
0	1
1	1
2	2
3	**3**
4	4
5	5
6	6
7	7
8	8
9	9

Missed Pulse Count (06x#)

8.6.6 Missed Pulse Count (06x#)

This option enables the pulse count to be varied from the default (3). This is the number of bad or missing pulses that are counted before the alarm occurs.

NOTE: The lower this option is set, the more likely you are to get false alarms.

8.6.7 Battery Alarm Voltage (07x#)

This option sets the battery voltage threshold below which the alarm will activate. The default Battery Alarm Voltage is 11.0 Volts and the unit will drop to low power at 10.0 Volts (after beeping 4 times).

If the unit enters Low Power mode due to a flat battery, the unit will automatically return to high voltage, without warning, when the mains voltage comes back on and the battery voltage rises.

Keypad Number	Alarm	Reduce Power
0	9.0 V	8.0 V
1	9.5 V	8.5 V
2	10.0 V	9.0 V
3	10.5 V	9.5 V
4	**11.0 V**	**10.0 V**
5	11.5 V	10.5 V
6	12.0 V	11.0 V
7	12.5 V	11.5 V
8	13.0 V	12.0 V
9	13.5 V	12.5 V

Battery Alarm Voltage (07x#)

8.6.8 Siren *On* Time (08x#)

This option sets the duration of time that the siren will remain on after a fence alarm occurs. After this time the siren will turn off for the *Off* time indicated in Table 8.6.9. The siren will sound again if the alarm is still present after this *Off* time has passed. The default is 3 minutes.

This may be the subject of local regulations to stop an alarm causing undue disturbance to neighbours, etc.

NOTE: The siren *On* time will be cut short if the battery falls below the low battery level.

Value	Time
0	10 Seconds
1	1 Minute
2	2 Minute
3	5 Minutes
4	**10 Minutes**
5	20 Minutes
6	30 Minutes
7	40 Minutes
8	50 Minutes
9	60 Minutes

Siren Off *time (09x#)*

8.6.10 Siren Cycles (10x#)

This option sets the maximum number of times the siren will sound for the *On* time if the alarm continues. This may be limited by local regulations to stop an alarm causing undue disturbance to neighbours, etc.

NOTE: This is the maximum number of cycles for 1 continuous alarm, intermittent alarm events could cause more than this number of siren soundings.

Value	Time
0	10 Seconds
1	30 Seconds
2	1 Minute
3	2 Minutes
4	**3 Minutes**
5	4 Minutes
6	5 Minutes
7	6 Minutes
8	7 Minutes
9	8 Minutes

Siren On *time (08x#)*

8.6.9 Siren *Off* time (09x#)

This option sets the amount of time the siren will be off for after the *on* time above has expired. If an alarm is still present after this *Off* time, the siren will sound again.

Value	Cycles
0	0
1	1
2	2
3	**3**
4	4
5	5
6	6
7	7
8	8
9	9

Siren Cycles (10x#)

8.6.11 Input Type (11x#)

The Z18 inputs can be inverted. Unless the input is used for a Gate switch, in which case it is always NC.

Value	Function
0	Gate
1	**Low Power**

Gate Input Function (12x#)

8.6.13 Gate Entry/Exit Delay (13x#)

This option sets the time between the gate switch opening and the siren sounding.

8.6.14 Chime Mode (14x#)

This option allows the energiser internal and keypad beeper to be used as a door chime for the gate switch. When set to *None*, the keypad beeper is used to indicate correct keypad operation only. In *Door Chime* mode, the beepers sound when the gate switch opens, even if the energiser is disarmed. If set to *Alarm*, the beepers mimic the siren function.

NOTE: "Gate" must be selected in option 12.

Value	Function
0	Bi-Polar
1	**Conventional**

Fence Mode(15x#)

Value	Function
0	**Normally Open (N.O.)**
1	Normally Closed (N.C.)

Input Inversion (11x#)

8.6.12 Input 3 Function Gate 2/ Low Power Mode (12x#)

When the Z18 input 3 is opened, the unit will go into *Low Power* mode. This function cannot be changed in the Z18 model.

Value	Time
0	10 Seconds
1	30 Seconds
2	**1 Minute**
3	2 Minutes
4	3 Minutes
5	4 Minutes
6	5 Minutes
7	6 Minutes
8	7 Minutes
9	8 Minutes

Gate Entry/Exit Delay (13x#)

Value	Function
0	None
1	Door Chime
2	**Alarm**

Chime mode (14x#)

8.6.15 Fence Mode (15x#)

This function is used to set *Bi-Polar* or *Conventional* mode.

8.6.16 Relay Functions

All relays can be set to any of the available functions (user assignable).

Relay 1 is (**21x#**)
Relay 2 is (**22x#**) etc.
The modes are explained in the table alongside.

The defaults for the Z18:

Relay 1 Strobe
Relay 2 Armed 1
Relay 3 Siren.

Value (x)	Mode
0	**Zone 1**
1	Zone 1 or Disarmed
2	Armed 1
3	Zone 2
4	Zone 2 or Disarmed
5	Armed 2
6	Zone 1 or Zone 2
7	General
8	Siren
9	Strobe 1
10	AC Fail
11	Low/Bad Battery
12	Tamper
13	Strobe 2

Relay Functions

8.6.17 Relay Function Details

Function	Logic for alarm state (opposite of normal state)
Zone x	Zone x is on AND the fence voltage has fallen below the programmed fence alarm voltage for more pulses than the missed count setting. Not latched.
Zone x alarm or off	Zone x is *Disarmed* OR the fence voltage has fallen below the programmed fence alarm voltage for more pulses than the missed count setting. Not Latched.
Armed x	Zone x is *Disarmed*.
Armed all	Both zones are *Disarmed*.
General	AC fail OR *Low Battery* OR *Internal Error* OR *Gate Alarm*. Latched for internal errors only.
Siren	*Fence Alarm* 1 OR *Fence Alarm* 2 Or *Gate Alarm*. Will time out after the siren time out time. This function is latched.
Strobe x	As per siren but does not time out, will remain on until unit is disarmed. This function is latched. Also indicates which gate input has caused an alarm.
AC Fail	Alarm on *AC Fail*
Battery	Alarm on low or bad battery

Relay Options

8.6.18 Group Mode (26x#)

A group must have only one master. The other units in the group are slaves. Group Voltage display units require each slave to have a different number. Since the keypad bus is common among the group one keypad can be used to program all units for all options except this one.

The procedure is:

Connect the keypad to each unit in turn, before linking all units into a group. Set this option: one unit as master the other as slaves.

NOTE: In some markets group mode may not be available.

For details on group wiring and operation see page 27 Figure 7.

Value (x)	Mode
0	**No Group**
1	Master
2	Slave 1
3	Slave 2
4	Slave 3
5	Slave 4
6	Slave 5
7	Slave 6
8	Slave 7
9	Slave 8

Group Mode (26x#)

1. Make sure the key switch is turned off and *Input1* is not connected to the *Com* terminal.
2. Connect the battery.
3. Connect the keypad.
4. On the keypad, enter [Installer's code] [*] [0] [#], then [26].
5. Enter the required value (e.g. [1] for master) then [#].
6. Enter [*] [#] to exit programming.
7. Connect the group using the keypad bus as per Figure 7.

NOTE: At this time groups are limited to a master and 14 slaves.

8.7 Diagram of Group Wiring

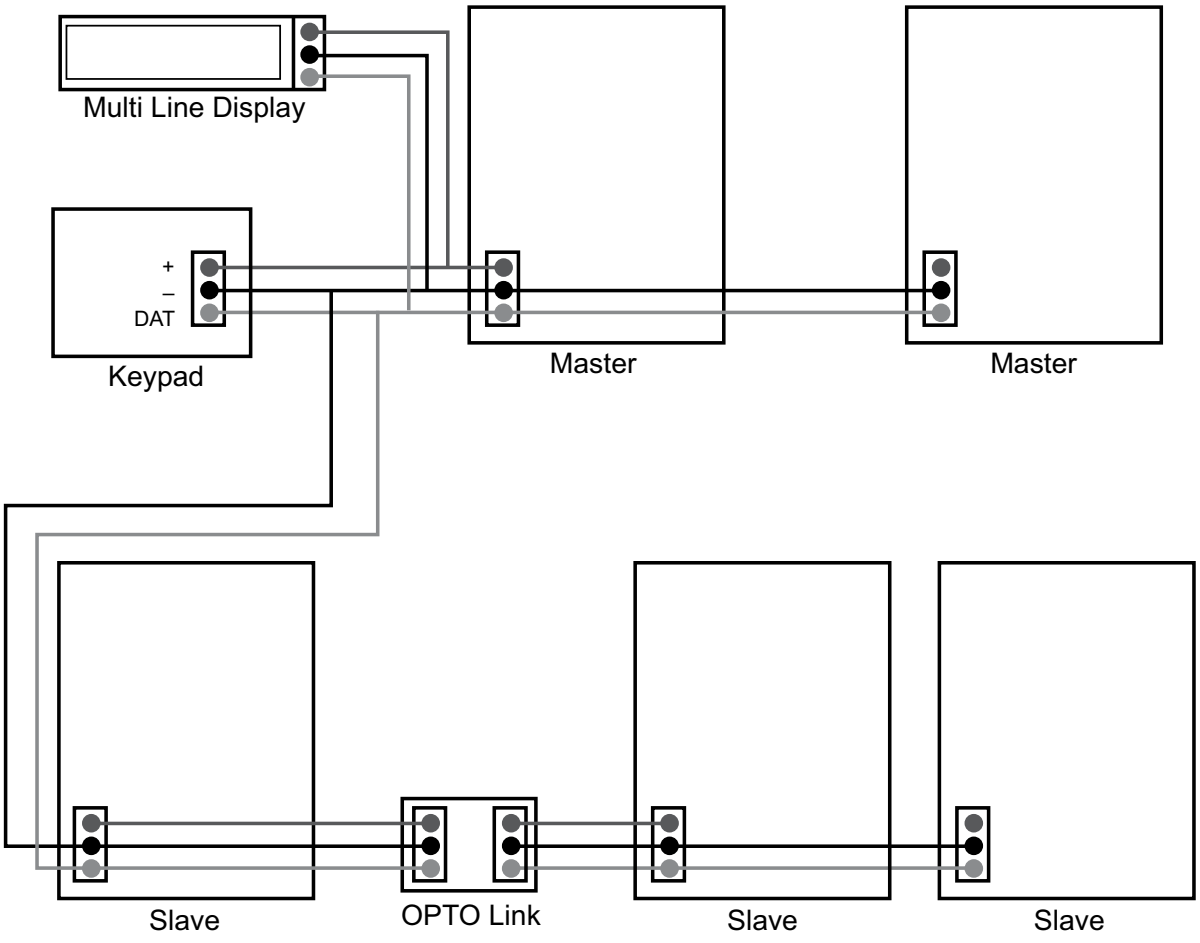


Figure 7: Group Mode Linking

9. ALPHA PLUS LCD KEYPAD FEATURES

9.1 Using the Alpha Plus LCD Keypad

The LCD keypad has two LED's: *Power* and *Arm*. They act as follows:

Power: *On* with Mains power, flashes on low battery.
Arm: On when the energiser is armed (pulsing); flashes when in *Low Power* mode.

All other indication is given via messages on the screen.

Whenever the keypad displays:

ALARM ZONE
FAULTED ZONE
or SYSTEM TROUBLE

pressing the [#] key will reveal more information, such as the name of the zone or the actual system trouble, e.g. *AC Fail*.

9.2 Changing the Keypad Messages

The messages and each of the 8 zone labels can be changed.

- The *Dealer Message* displays when the system is on standby.
- *Zone Labels* displays after the [#] key is pressed during alarm memory or faults.
- The programmable *Service Message* is displayed during AC failure, fuse failure, communication failure, or low battery.

[1]	[2] Character up	[3] not used	Emergency not used
[4] ← Cursor left	[5] Next Message	[6] → Cursor right	Fire not used
[7]	[8] Character down	[9]	Panic not used
[*]	[0] Last Message	[#] Enter/Exit	Bypass not used

Keys Used For Changing Messages

- To activate the *Keypad Programming Mode*, enter the [Installer's Code] [*] [0] [1] [#]. Information may be entered into the keypad in the form of letters (upper and lower case), numbers (0–9), and 22 special symbols. All characters are displayed in the order: upper and lower case letters, numbers, and special symbols. The [Space] character precedes the letter A.
- To enter a Label, use the [2] key to scroll through the characters until you reach the desired character. If you scroll past the desired character, the [8] key may be used to scroll backwards. NOTE: *The space character is before the A character (When A is displayed, press [8] to get a space).*
- When the desired character is displayed, press the [6] key to move the cursor to the next character position. The [4] key moves the cursor to the left.
- When all characters have been entered, press the [#] key to enter the message and move to the next message position.
- Use the [0] key to move backward through the messages.
  NOTE: *If you move to the next message using [5] instead of the [#] key you will lose any changes you made!*

The message order is:

- *Service Message* (Displayed under *"System Trouble"*)
- *Dealer Message* (Displayed under the standby message: *"Ready to Arm"*)
- *Soft Zone Identifiers* (A, B, And C) (not used)
- *Hardwired Loop Identifiers* (Zone 1 = Gate, Zone 3 = Fence)
- *Keypad Address* (must be left at 1)

9.3 To Exit Keypad Programming

When you have finished programming, press [*] [#].

NOTE: *The keypad will also exit the programming mode if you do not press any key within a five minute period.*

9.4 Other Keypad Functions

- To turn the backlight on or off. [*][8][#]
- To turn the audible feedback on or off. [*][5][1][#]
- To change the Keypad Messages to English [*][3][1][#]
- To change the Keypad Messages to Spanish [*][3][2][#]

10. SECTOR SETUP TESTS AND ADJUSTMENT

With a single sector system there are three considerations for the electric fence monitor voltage level:

1. The monitor should trigger the alarm if one of the live wires is shorted to ground.
2. The monitor should trigger the alarm if one of the live wires is cut.

Use common sense and turn the energiser off when making changes to the fence, then turn the energiser back on to check the effects.

10.1 Basic Fence Tests

1. Energise the newly-completed fence.
2. Use an Electric Fence Power Probe to find any construction faults.
3. Check that there is voltage on all live wires (continuity) and that there are no shorts from live to earth, or between live circuits (Bi-Polar).
4. Check the electric fence earth. (See electric fence manuals.) One method is to make an intentional short from live wire to earthed metal (not +ve to -ve if using Bi-Polar). The voltage at the earthed point should be less than a few hundred volts; the voltage on the earth stake with respect to any nearby earthed metal should be less than a few hundred volts.
5. Record the start and end of fence live wire voltages.

   NOTE: Bi-Polar systems should have approximately equal voltages with respect to earth.
6. Record the live wire currents going out from the energiser to the fence.

At this point there must be a reasonable voltage on all parts of the fence. To be an effective barrier, the Power Probe (or voltmeter) readings between wires (live to earth or +ve to -ve for Bi-Polar) must be greater than 5.0kV. If they are not, a larger energiser may be required.

10.2 Fault Condition Tests

1. To simulate a break, disconnect a joint in the live wires at some convenient point on the fence, making sure that the wires do not short to ground or between +ve and -ve wires.
2. Check that the energiser fence alarm activates. If not, check the voltage (using an electric fence voltmeter) at the inputs to the monitor. Set the fence alarm voltage level higher than this voltage. If there is still considerable voltage, you may have induced voltage in the live return wires. If so, reduce the induced voltage by placing a 3000 Ohm, 10 Watt resistor between the live return and earth return terminals (or from +ve to -ve in a Bi-Polar system) at the monitor.
3. Reconnect the live wires.
4. Place a short on the fence live wires.
5. Check that the monitor goes into alarm.
6. Remove the short.

11. S.A. STANDARD REQUIREMENTS FOR ELECTRIC SECURITY FENCES

The JVA range of energisers has been extensively tested and certified in accordance with international standards. JVA does not take responsibility for the erection standards of the fence. It is the responsibility of the erector to consult and comply with the S.A. Standards and Code of Practice for the installation and erection of electric security fences. For the user's convenience, we include the S.A. Standard Requirements here but the installer also needs to consult S.A. Standards: The Construction of Electric Fences and SABS 1063, 0142, SABS IEC 60335-2-76. These are available from the S.A. Bureau of Standards.

11.1 Definitions

Physical Barrier
A barrier of not less than 1.5m in height and intended to prevent inadvertent contact of persons with the conductors of the electric fence.

NOTE: Physical barriers are typically constructed from vertical sheeting, rigid vertical bars, rigid mesh or rods of chain wire mesh.

Public Access Area
Any area where persons are protected from inadvertent contact with pulsed conductors by a physical barrier (see above).

Pulsed Conductors
Conductors that are subjected to high voltage pulses by the energiser.

Secure Area
An area where a person is not separated by a physical barrier (see above) from pulsed conductors (see above) below 1.5m.

11.2 Installation, Operation and Maintenance

11.2.1 Electric security fences and their ancillary equipment shall be installed, operated and maintained in a way that minimises danger to persons, and reduces the risk of persons receiving an electric shock unless they attempt to penetrate the physical barrier, or are unauthorised to be in the secure area.

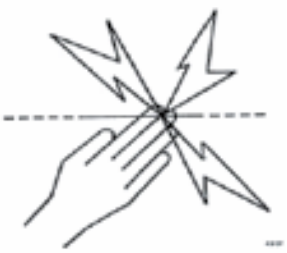
11.2.2 A space of 2.5m shall be maintained between uninsulated electric fence conductors or uninsulated connecting leads that are supplied from different energisers. This space can be less where the conductors or the connecting leads are covered by insulating sleeving, or consist of insulated cables that are rated to at least 10kV.

11.2.3 The requirement in 10.2.2 does not apply in cases where the separately energised conductors are separated by a physical barrier that has no openings greater than 50mm.

11.2.4 A vertical separation of not less than 2m shall be maintained between pulsed conductors fed from different energisers.

11.2.5 Mains supply wiring shall not be installed in the same conduit as signalling leads associated with the electric security fence installation, but shall be installed in accordance with the requirements given in SABS 0142.
* NB. *(Fence HT leads must under no circumstances be routed in the same conduit as any other wiring.)*

11.3 Warning Signs



NOTE: Regulation warning signs are available from all Stafix Electric Fence centres and all Stafix certified dealers.

11.3.1 Electric security fences shall be identified by prominently placed warning signs that shall be legible from the secure area and from the public area.

11.3.2 Each side of the electric security fence will have at least one warning sign.

11.3.3 A warning sign shall be placed:
a. at each gate
b. at each access point
c. at intervals not exceeding 10m
d. adjacent to each sign with regard to chemical hazards, for emergency services information.

11.4 Gates

Gates in electric security fences shall be capable of being opened without the person who is operating the gate receiving a shock.

11.5 Earthing

11.5.1 Where an electric security fence passes below bare power line conductors, the highest metallic element shall be effectively earthed for a distance of not less than 5m on either side of the crossing point.

11.5.2 The distance between any electric fence earth electrode and other earth systems shall be not less than 10m, except when the earth system is associated with a graded earth mat. The earth electrode shall comply with SASS 10611. Amendment 1, Deco 2000 1.

11.5.3 All exposed conductive parts of the physical barrier shall be effectively earthed.

11.6 Protection

11.6.1 All ancillary equipment connected to the fence circuit shall be designed to provide a degree of isolation between a fence circuit and the supply mains equivalent to that specified for the energiser.

11.6.2 Protection from weather shall be provided for the ancillary equipment unless the equipment is certified by the manufacturer as being suitable for use outdoors, and is of a type with a minimum degree of protection IPX4 (protected against splashing water).

Power line voltage	Minimum clearance
<1 000	3m
>1 000 and <33 000	4m
>33 000	5m

Fence to Powerline Minimum Clearance

Figure 1
Typical constructions where the electric security fence is exposed to the public.

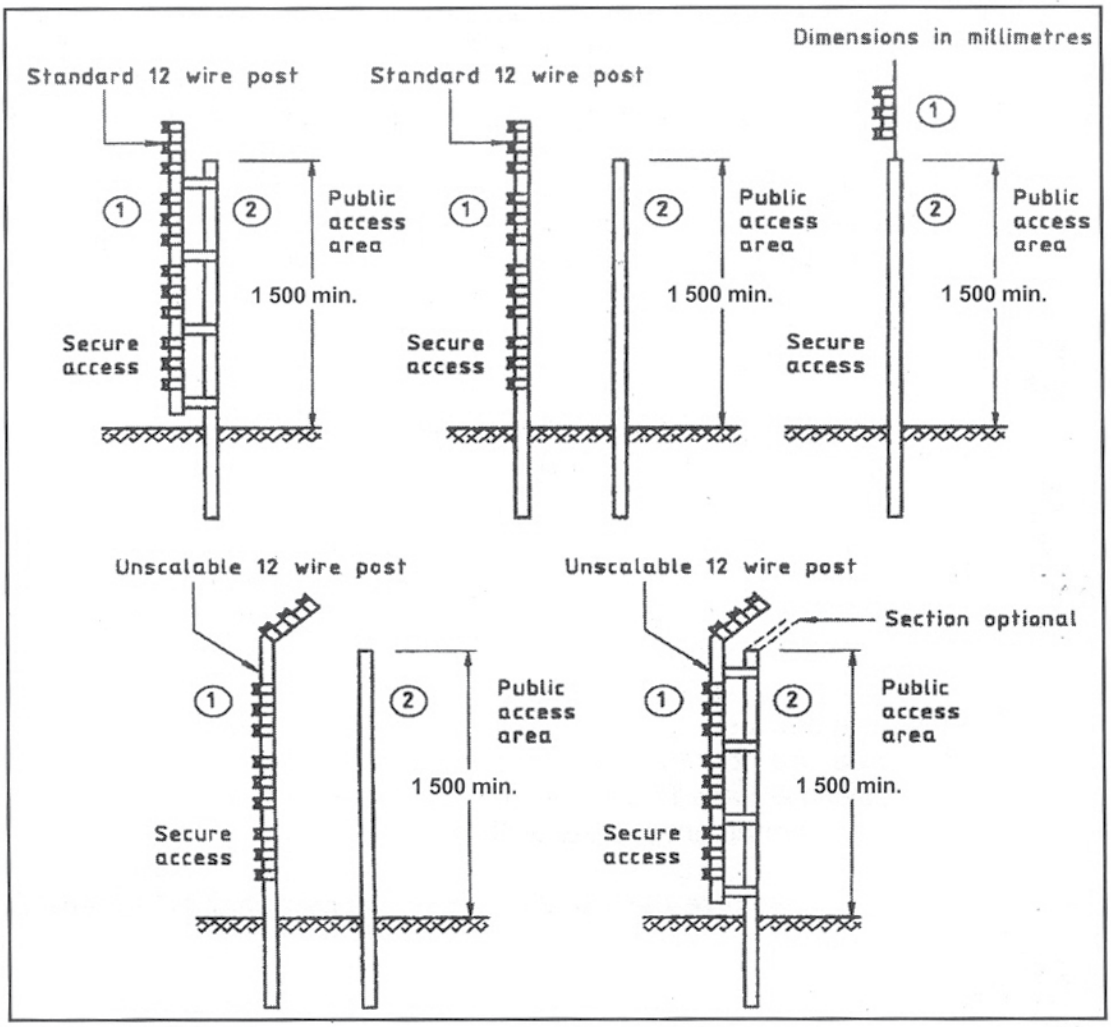


Figure 2
Typical fence constructions where the electric security fence is installed in windows and skylights.

Key: ① Electric security fence ② Physical barrier

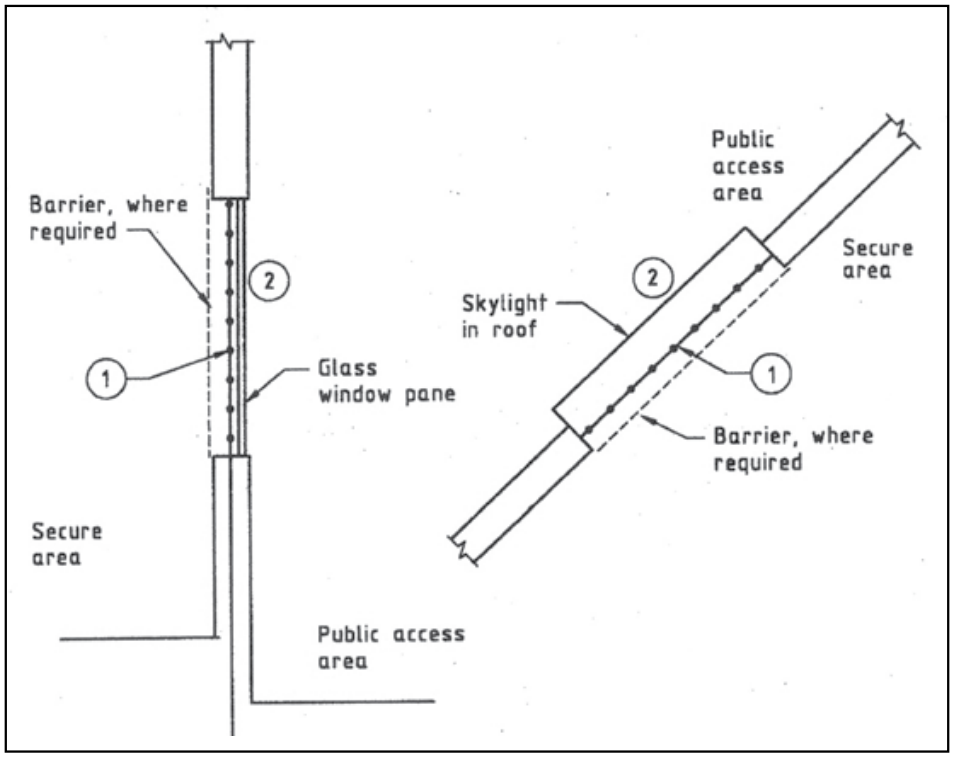
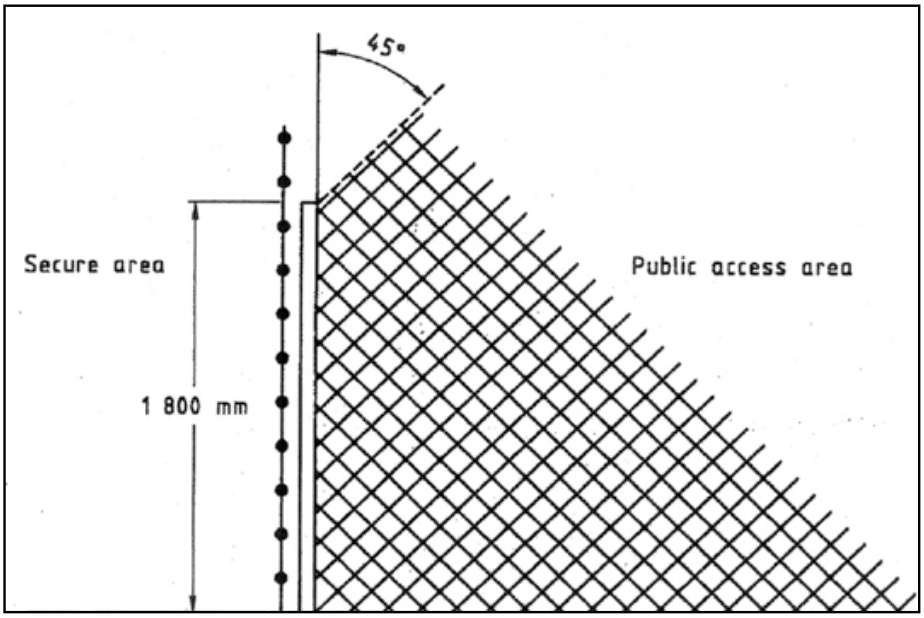


Figure 3
Prohibited zone for pulsed conductors.

Key: Electric security fence Physical barrier Prohibited zone



12. WARRANTY

All JVA products carry a **2-year warranty** against defective components and workmanship. The warranty excludes damage caused by acts of Nature such as lightning or flooding, power supply surges, rough handling, malicious actions or incorrect wiring.

Whilst every effort has been made to check that the information contained is accurate, JVA Technologies Pty Ltd will not be liable to loss or damage resulting from construction, operation or failure of any installation or system. Installation of security electric fences should be made by trained professionals with regard to the relevant local standards and workplace health and safety requirements.

Product model purchased: ..... Serial No: .....

Customer Name: .....

Address: .....

.....

.....

Postal Code: .....

Tel. No: Cell: ..... Landline: .....

email: .....

Date purchased: .....

Invoice No: .....

Dealer Name: .....

Dealer's Stamp

Mail to:

JVA Service Department P.O. Box 13898, Cascades 3202